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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,237	07/29/2003	Francis J. DiSalvo JR.	C1134.70003US00	8278
7590	04/04/2006		EXAMINER LEWIS, BEN	
Rober H. Walat Wolf, Greenfield & Sacks, P.C. 600 Atlantic Avenue Boston, MA 02210			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/630,237	DISALVO ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-90 is/are pending in the application.
- 4a) Of the above claim(s) 15-90 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/13/05</u> | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election with traverse of Group I, claims 1-14, in Paper filed March 2<sup>nd</sup> 2006 is acknowledged. The traversal is on the ground(s) that no serious burden on the examiner to conduct search and examination covering all claims. This is not found persuasive because regardless of search method, inventions of different limitations will require different search strategies, and the times to consider the relevancy of collective references would increase proportionally as well.

The requirement is still deemed proper and is therefore made FINAL. Therefore, claims 15-90 are withdrawn from consideration.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Lukehart et al. (U.S. Patent No. 6,232,264 B1).

With respect to claims 1 and 7, Lukehart et al disclose polymetallic precursors wherein the invention includes a fuel cell catalyst composition which comprises a supported nanocomposite (Col 6 lines 65-67). The nanoparticles in the nanocomposite of the present invention are preferably substantially formed of, and more preferably

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virtually solely formed of the crystalline alloy "ordered" form of the first metal and the second metal. By way of example, such crystalline alloy forms would include PtRu, PtSn, Pt<sub>2</sub>W, Pt<sub>3</sub>Sn, Pt<sub>3</sub>Ru, Pt<sub>3</sub>Mo, RuMo, mixtures of various of these forms with PtP<sub>2</sub>, and various other stoichiometric combinations of core metals of the precursors described herein (Col 20 lines 25-35).

With respect to claims 2 and 3, Lukehart et al teach that the nanoparticles in the nanocomposite of the present invention are preferably substantially formed of, and more preferably virtually solely formed of the crystalline alloy "ordered" form of the first metal and the second metal. By way of example, such crystalline alloy forms would include PtRu, PtSn, Pt<sub>2</sub>W, Pt<sub>3</sub>Sn, Pt<sub>3</sub>Ru, Pt<sub>3</sub>Mo, RuMo, mixtures of various of these forms with PtP<sub>2</sub>, and various other stoichiometric combinations of core metals of the precursors described herein (Col 20 lines 25-35).

With respect to claims 4, 6 and 11, Lukehart et al teach that the first metal is preferably a noble metal such as platinum, palladium, gold, or any other transition metal or Lanthanide metal. The at least one second metal may be any of the metals acceptable for the at least one first metal including metals from Groups 13-16, like tin. (Col 4 lines 20-30). Bi is a group 15 metal and In is a group 13 metal.

With respect to claim 5, Lukehart et al teach that such carbon-supported nanoparticles, particularly platinum and platinum-rich alloy nanoparticles, such as

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platinum-ruthenium, are useful fuel cell catalysts. Catalysts that have been studied include PtRu, Pt<sub>3</sub> Ru, and PtPb. These catalysts have also been investigated for use as anode catalysts in fuel cells (Col 4 lines 20-30).

With respect to claim 8, Lukehart et al teach that the composition may be formed into an electrode, such as an anode or cathode, for use in a fuel cell such as a DMFC by standard methods using standard ink electrode technology. When methanol is added to the fuel cell and contacts the electrode in the presence of oxygen, the oxidation of methanol is catalyzed by the nanoparticles and electrons extracted from methanol can be passed through the conductive connection of the particles to the support, and through the support to an external circuit, whereby direct current may be generated (Col 20 lines 25-35).

With respect to claim 9, Lukehart et al teach that in one preferred embodiment, all of the precursor is thermally degradable, including bridging and non-bridging ligands, with the exception of the core metals, i.e., the first and second metals (or higher numbers of metals for ternary or higher alloys), which would form the alloy phase of a nanocomposite formed from the precursor (Col 10 lines 30-47).

With respect to claim 10, Lukehart et al teach that the first metal is preferably a noble metal such as platinum, palladium, gold, or any other transition metal or Lanthanide metal (Col 12 lines 24-38).

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With respect to claim 12, Lukehart et al teach the polymetallic precursor, wherein the at least one first metal is platinum and the stoichiometric ratio of the at least one first metal to the at least one second metal is greater than or equal to about 1 (Col 47 lines 57-64).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lukehart et al. (U.S. Patent No. 6,232,264 B1) as applied to claims 1-13 above and further in view of Watanabe et al. (U.S. Patent No. 5,922,487).

With respect to claim 14, Lukehart et al disclose polymetallic precursors wherein the invention includes a fuel cell catalyst composition which comprises a supported nanocomposite in paragraph 2 above. Lukehart et al do not specifically teach wherein the ordered intermetallic compound oxidizes carbon monoxide. However, Watanabe et al. disclose anode electrocatalysts for fuel cell wherein a first anode electrocatalyst of the present invention is the alloy essentially consisting of 1 to 60 atomic % of tin and the balance of one or more noble metals, and the alloy of the invention includes an amorphous alloy, a solid solution and an intermetallic compound (Col 2 lines 50-65).

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Although the reason why the combination of the noble metal and the tin, germanium and/or molybdenum, or the addition of the tin and the like to the noble metal depresses the poisoning of the carbon monoxide is not elucidated, it is supposed to be the synergetic effect produced by the following two effects, that is, the amount of the carbon monoxide to be adsorbed decreases or the adsorption itself is prevented because the adsorption sites for the carbon monoxide are occupied by the tin or the like, and the carbon monoxide once adsorbed is oxidized to carbon dioxide by means of the tin or the like functioning as an oxidation catalyst for the removal of the carbon monoxide (Col 4 lines 20-38). Therefore it would have been obvious to one of ordinary skill in the art to incorporate the electrocatalysts of Watanabe et al into the fuel cell system of Lukehart et al because Watanabe et al. teach that although the reason why the combination of the noble metal and the tin, germanium and/or molybdenum, or the addition of the tin and the like to the noble metal depresses the poisoning of the carbon monoxide is not elucidated, it is supposed to be the synergetic effect produced by the following two effects, that is, the amount of the carbon monoxide to be adsorbed decreases or the adsorption itself is prevented because the adsorption sites for the carbon monoxide are occupied by the tin or the like, and the carbon monoxide once adsorbed is oxidized to carbon dioxide by means of the tin or the like functioning as an oxidation catalyst for the removal of the carbon monoxide (Col 4 lines 20-38)

With respect to claim 13, Lukehart et al teach that the nanoparticles in the nanocomposite of the present invention are preferably substantially formed of, and more

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preferably virtually solely formed of the crystalline alloy "ordered" form of the first metal and the second metal. By way of example, such crystalline alloy forms would include PtRu, PtSn, Pt<sub>2</sub>W, Pt<sub>3</sub>Sn, Pt<sub>3</sub>Ru, Pt<sub>3</sub>Mo, RuMo, mixtures of various of these forms with PtP<sub>2</sub>, and various other stoichiometric combinations of core metals of the precursors described herein (Col 20 lines 25-35). Lukehart et al also teach that the first metal is preferably a noble metal such as platinum, palladium, gold, or any other transition metal or Lanthanide metal. The at least one second metal may be any of the metals acceptable for the at least one first metal including metals from Groups 13-16, like tin. (Col 4 lines 20-30)

The instant specification recites: The invention provides a catalyst that comprises an ordered intermetallic compound and is designed for use in a catalytic system. In some embodiments, the catalyst may comprise an ordered platinum intermetallic compound, such as BiPt, Bi<sub>2</sub>Pt, PtIn, PtPb, PtGe, PtIn<sub>2</sub>, PtIn<sub>3</sub>, Pt<sub>3</sub>In<sub>7</sub>, PtSn, PtSn<sub>2</sub>, Pt<sub>3</sub>Sn, Pt<sub>2</sub>Sn<sub>3</sub>, PtSn<sub>4</sub>, PtSb, PtSb<sub>2</sub>, PtGa, PtCd<sub>2</sub>, and PtMn. In some embodiments, the catalyst may comprise an ordered palladium intermetallic compound (Paragraph 0011).

Lukehart et al et al do not specifically teach wherein the ordered intermetallic compound has an interatomic nearest neighbor distances of greater than at least 3.0 Angstroms along at least one axis. However, it is the position of the examiner that such properties are inherent, given that Lukehart et al and the present application utilize the same elements which are both made in a crystalline "ordered" form. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing

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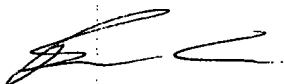
feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ben Lewis



Patent Examiner  
Art Unit 1745.



PATRICK JOSEPH RYAN  
SUPERVISORY PATENT EXAMINER

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